Department of Electronics & Communication Engineering
Subject: Assignment for ECE VIII SEM “D” students on Satellite Communication Engineering (Code: EE-404-E) to be submitted by the 15th March 2010.

ASSIGNMENT-1
(1) Explain the structure of a satellite communication system. Also discuss the advantages of satellite communication. Why satellite communication is preferred over optical communication which has very high bandwidth. Explain five such important applications.
(2) Discuss the system noise temperature, C/N and G/T ratio.
(3) Discuss and derive the complete link design equation used for satellite communication system.
(4) What are the intermodulation products and discuss their effects in FM/FDM, systems.
(5) What is ‘energy dispersal’? Discuss its application for satellite communication. Also, explain the dispersal signal.
(6) Explain FDM techniques. Also discuss S/N and C/N ratio in frequency modulation in satellite link.
(7) Discuss the active and passive satellites. Briefly scan through their historical development and growth and emergence of the present satellite communication scenario.
(8) What are the factors that affect the uplink design and downlink design in geostationary satellite communication? Discuss in detail.
(9) Explain the parameters that control the design of earth station.
(10) Calculate noise performance in telephone channel. Also discuss single channel per carrier system.
(11) Using detailed block diagram, explain briefly the general structure of a satellite communication system and the earth station.
(12) Discuss advantages of digital satellite communication and its limitation.
(13) Explain system noise temperature, C/N ratio, G/T ratio, atmospheric attenuation as a function of frequency, and rain attenuation factor.
(14) What is geostationary satellite? Stating assumptions made, calculate the orbital height above the equator.
(15) Explain the basic differences between an active and passive satellite systems. Discuss their merits and demerits.
(16) List frequency bands used for satellite communication and their application. Compare advantages and disadvantages of different bands considering the effects of propagation media.
(17) Explain Modems and Codecs in details using block diagram. Whether modems and decoders are A/D & D/A convertors? Explain differences between them? Mention the areas of their applications.
(18) For a satellite earth station receiver working on 4 GHz, the typical gains and noise temperatures are $T_{in}=50K$, $T_{rf}=50K$, $T_{m}=500K$, $T_{if}=1000K$, $G_{rf}=23$ db, $G_{m}=0$ db. Calculate the system noise temperature.
(19) What are the advantages & disadvantages of Analog & digital Communication through satellite?
(20) What is meant by “threshold” in FM detector? Explain FM improvement and derive S/N ratio for SCPC signals.

(Issuance of the Comprehensive Assignment covering units I thro’ III of the subject course for VIII Semester ECE “D” Group Students by Professor Subhash Chander Duggal who is currently teaching them the subject course)